

Science Review: Meal Replacements in Weight Loss & Maintenance

Introduction

Meal replacements (MRs) are typically products intended to replace an entire meal. Forms of MRs usually vary from shakes, powdered shake mixes, bars, or soups. MRs are different from protein supplements in that they provide a range of macro- and micronutrients that would otherwise be found in a meal. One of the weight loss and weight maintenance strategies involves the use of MRs as part of a low-calorie diet (LCD).

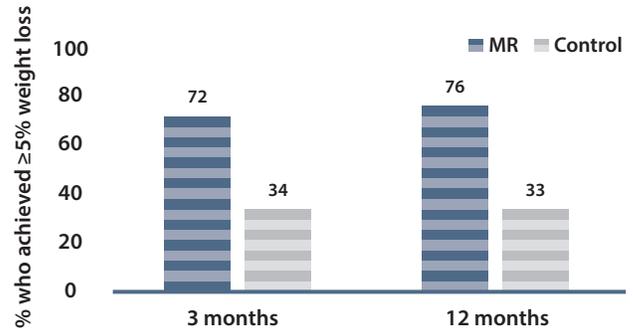
Research Highlights

- ✓ In a meta-analysis of 6 weight loss studies that compared MRs in a structured meal plan with a conventional LCD plan (the calorie intake was the same for both plans), greater total weight loss was achieved with MRs in a structured meal plan at 3 months (7% vs. 4%) and 12 months (7-8% vs. 3-7%) than with a conventional LCD plan.¹
- ✓ In a meta-analysis (20 studies; n=3,017), MRs were seen to have significant benefit for longer-term (>12 months) weight loss maintenance.²
- ✓ In a prospective study aiming to understand the dose-response of MR use on total weight loss, 2 servings of MRs per day led to greater total weight loss outcomes than 1 serving per day at 3 months (1.8±2.1 kg versus 4.1±4.5 kg total weight loss in the 1- and 2-serving groups, respectively).³

Clinical evidence of MRs in weight loss and weight maintenance

- Controlled feeding studies have shown that when a MR is consumed at lunch, ~250 fewer calories were consumed than when lunch was chosen freely by participants. Interestingly, the participants did not compensate for the reduced caloric intake at other meals during the 10-day study, leading to a reduced caloric intake overall.⁴
- In a 12-week randomized controlled trial that investigated the effect of a conventional LCD with MR or without MR for weight control, 77% of subjects in the LCD with MR group lost > 5% total body weight compared with 50% of subjects in the LCD without MR group.⁵
- In a meta-analysis of 6 weight loss studies that compared MRs in a structured meal plan with a conventional LCD plan (the calorie intake was the same for both plans), greater total weight loss was achieved with MRs in a structured meal plan at 3 months (7% vs. 4%) and 12 months (7-8% vs. 3-7%) than with a conventional LCD plan. Additionally, the number of participants experiencing total weight loss of ≥ 5% was significantly higher with MRs in a structured meal plan compared with a conventional LCD plan at 3 months (72% vs. 34%) and at 12 months (76% vs. 33%).¹ (Figure 1)

Figure 1. Results of a meta-analysis showing % of participants who achieved ≥ 5% weight loss goals.



The analysis combined data from 6 trials involving 249 subjects in the MR in a structured meal plan group and 238 subjects in a conventional LCD plan group (adapted from Heymsfield et al. 2003).¹

- In a meta-analysis (20 studies; n=3,017) that evaluated the effects of different weight-loss maintenance approaches after an initial LCD diet, MRs were seen to have significant benefit for longer-term (>12 months) weight loss maintenance.² Compared with control (LCD), extended use of MRs improved weight-loss maintenance by 3.9 kg (95% CI: 2.8–5.5 kg; p< 0.001). (Table 1)

Table 1. Body weight change during the weight loss maintenance period in a meta-analysis of 20 trials that evaluated different weight loss maintenance strategies after an initial LCD. (adapted from Johansson et al. 2014).²

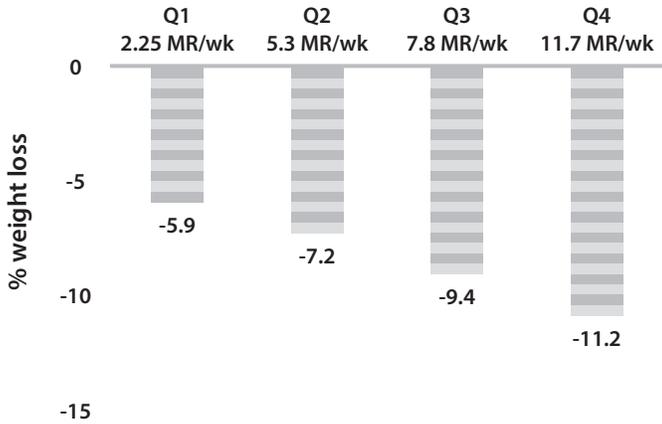
	Mean Difference Compared with Control (95% CI)	p-value	Median Maintenance Phase Duration
High-protein diet	-1.5 kg (-2.1 kg to -0.8 kg)	< 0.001	5 months
Anti-obesity drugs	-3.5 kg (-5.5 kg to -1.5 kg)	< 0.001	18 months
Meal replacements	-3.9 kg (-5.0 kg to -2.8 kg)	< 0.001	12 months

- Use of MRs by individuals with obesity has been associated with greater improvements in metabolic markers, such as insulin resistance as assessed by HOMA-IR, at 6 and 12 months, which may be driven by the increased weight loss observed.⁶
- MRs have been recommended by several Expert Working Groups as a tool for weight management.⁷⁻⁹ For example, the Academy of Nutrition and Dietetics states that the RDN should recommend portion control and MRs or structured meal plans as part of a comprehensive weight management program.⁷ American Association of Clinical Endocrinologists/American College of Endocrinology states that portion-controlled diets or MRs (using packaged foods containing 180-350 calories) can contribute to early initial weight loss.⁸

Dose response effect seen with MR intake

The Look AHEAD study found the number of MRs consumed as part of a structured intervention was significantly related to total weight loss at 6 and 12 months. Participants with highest MR intake had 4.0X greater odds of reaching the 7% total weight loss goal and 4.1X greater odds of reaching the 10% total weight loss goal than participants with lowest intake. Additionally, total weight loss was almost doubled in participants in Q4 (highest MR intake) compared with Q1 (lowest MR intake).¹⁰ (Figure 2)

Figure 2. % weight loss over 1 year broken down by quartile of MR intake.



Participants from the Look AHEAD Intensive Lifestyle Intervention (ILI) group. MR intake over 12 months per quartile: Q1 (117); Q2 (277); Q3 (406); Q4 (608). Average MR intake per week is calculated as total 12-month intake/52 (adapted from Wadden et al. 2009).¹⁰

Conclusions

Inclusion of MRs within LCD plans has been shown to contribute to greater total weight loss and a greater proportion of participants meeting total weight loss goals both in the short term (3 months) and longer term (12 months).¹ Meta-analyses have highlighted the benefit of continued use of MRs to support weight loss maintenance.^{1,2} Evidence of a dose response to MRs exists, with greater total weight loss associated with higher intakes.^{3,10} MRs are thought to support weight management by facilitating reduced caloric intake by providing a proportioned and set amount of energy.⁴

References:

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